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Therapeutic Insights into Ashwagandha: A Review of Its Role In Modulating Mental Health and Ameliorating Anxiety and Depression

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Effective and widely available treatments are required due to the rising incidence of anxiety and depression in contemporary communities. Anxiety undermines a healthy lifestyle by disrupting routines, impairing sleep, and affecting overall well-being and serve as a risk factor for several diseases, including cardiovascular and metabolic disorders, affecting people of all socioeconomic backgrounds. *Withania Somnifera*, often known as ashwagandha, is an adaptogenic plant used in ancient Ayurvedic medicine. It has attracted a lot of attention recently due to its ability to enhance many components of health and wellness. One of its noticeable characteristics is that it helps balance brain chemicals like cortisol, serotonin, and dopamine and improve sleep. It also increases the activity of GABA receptors, which calms the brain and reduces anxiety and stress. This review looked at the potential of root extract of *Withania Somnifera* as a substitute treatment for treating generalised anxiety disorder and depression, conditions that significantly impact mental health globally. This analysis aims to review the recent findings suggesting that *Withania Somnifera* might be a promising natural treatment for enhancing mental wellbeing by regulating stress responses, inducing relaxation, and uplifting mood. The review refers to the safe intended doses of ashwagandha root extract of 600 mg per day, which does not significantly affect health and is usually well tolerated by the body.

Keywords: Ashwagandha roots, withanolides, stress, inflammation, neurotransmitters regulation, safe dose.

INTRODUCTION

Ashwagandha is a small shrub, which in the Sanskrit terms is a combination of the two words ashwa, meaning horse and gandha meaning smell means the particular shrub that smells like a sweaty horse, belongs to the family Solanaceae. Also, identified by the name of ajagandha, and ginseng of India. Because it has curative qualities, it is also given other names such as poison gooseberry and winter cherry (Gaurav *et al*., 2023). Ajagandha is a difficult, drought-resistant species of plant which grows in dry regions mostly in Pakistan, South Africa, Mediterranean, Middle East, tropical Africa, Sri Lanka, Afghanistan, Nepal, and Baluchistan. It grows in open spaces, fields, and wastelands in India. It yields in some regions of Rajasthan and Madhya Pradesh on a large scale, it is a common crop (Durg *et al*., 2015). Two ashwagandha cultivars are employed in Sri Lanka; the cultivar of Indian is beneficial for treatment and medicine research as it has its composition like starch, while the cultivar species of local has a lot of roots that are fibrous which is challenging to make into powder (Gaurav *et al*., 2023).

This herb has medicinal properties and several parts of this has been used for several generations to treat several kinds of diseases. Roots which are mature and dried, are the most commonly used section of the plant (Durg *et al*., 2015). Ayurveda has long been a form of adaptogen working under medical practices of India. Research revealed that the ashwagandha plant harbors over fifty chemical components. These are called withanolides, with the two biggest families being lactones and steroidal alkaloids (Lopresti *et al*., 2019). Expressed in general terms, this shrub has some bioactive components such as sitoindosides; withaferin A; glycowithanolides and withanolides, together with many other medically useful phytochemicals identified in the plant (Choudhary *et al*., 2017). Root extract of ajagandha exhibits certain similarity with that active product of Panax ginseng, containing ergostane and a combination of steroidal and lactones such as withanolide C, withanolides, almost 0.2% alkaloids, and withanone (Durg *et al*., 2015).

Ashwagandha for a long time has been widely utilised for fostering "youthful vigour" through enhancements in general health, muscle strength, and endurance (Sharma *et al*., 2015).

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Table 1. Various chemical components and their derivatives of ashwagandha.

Bioactive compounds	Part of plant	Derivatives	Uses	References
Alkaloids	Leaves, stems and roots	Somniferinine, Withanine and Withasomnine.	Relief palpitation related to Psychiatric.	(Lopresti et al., 2019)
Saponins	Berries and roots	Sitoindoside.	Reduce the depression	(Vishweswari et al., 2013)
Flavonoids	Stems	Kaempferol	Reduce the anxiety.	(Gaurav et al., 2023)
Steroids	Roots	Ergostane, β-sitosterol, and Sitoindosides.	Aphrodisiac.	(Salve et al., 2019)
Phenolic	Found in stems	catechin	Inflammation reduction	(Hashem et al., 2023)
Glycosides	Stems and Roots	Withanamides.	Relax the muscles and Sedative.	(Langade et al., 2021)
Tannins	Found in flowers, fruits, roots and leaves	Somninine and Withananine.	Reduction in inflammation and healing of wounds.	(Sukumar et al., 2020)
Steroidal lactones	Present in roots and leaves	Withaferin–A and Withasomniferine	Anti-anxiety, and improvement of fertility	(Pal et al., 2015)

Ashwagandha is getting increasingly popular as insomnia and anxiety reliever. This based on certain claims that it help to sustain psychological wellness by regenerating the cells in addition to the mental state of the depressed person (Deshpande *et al*., 2020). They are said to have renewing effects that improve the body's liveliness. Having been used for decades as a wide-spectrum drug in India, ashwagandha is now being studied in a scientific setting and getting more research work done (Pratte *et al*., 2014).

Certain claims based on research have it to help primarily in the regaining of psychological health through cellular regeneration in parallel to the depressed person's psychological condition (Deshpande *et al*., 2020). For a long time, ashwagandha has been used to derive that "youthful efficiency" through betterment of general health and strength of muscles (Sharma *et al*., 2015). Nowadays, Ashwagandha is increasingly becoming popular as a remedy for insomnia and anxiety. India has used ashwagandha as a wide range drug for thousands of years, ashwagandha is now under a microscope for scientific scrutiny, and the demand for research work is on the rise (Pratte *et al*., 2014).

Ajagandha root in its powdered form has antistress activity and is also rich in flavonoids and other phenolic resources that boost antioxidant activity. This herb is generally considered to be entirely suitable when administered in recommended doses and combinations (Salve *et al*., 2019). Studies have validated that *Withania Somnifera* is involved in all aspects of life including the reduction of inflammatory conditions, anxiety pacification, inducing sleep, conserving brain cells and memory aid (Nayak *et al*., 2015). Ajagandha has been shown to be safe and well tolerated in numerous clinical studies conducted for a variety of clinical conditions. This herb too, it is believed, acts on the oxidative stress generators in the brain including glutathione, superoxide dismutase and glutathione peroxidase and lipid peroxidation. The extract of the root of ajagandha may have an impact on neural network rejuvenation since it can stimulate dendritic and axon proliferation (Durg *et al*., 2015).

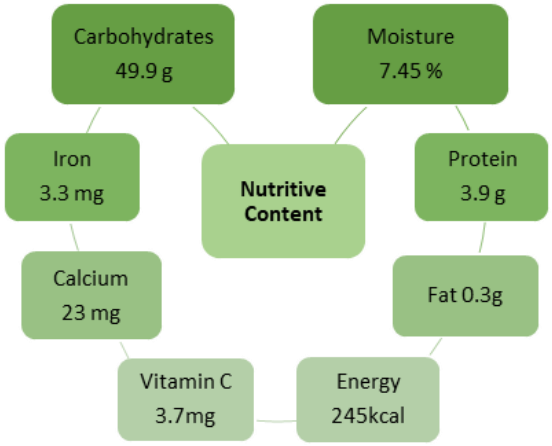

Figure 1. Nutritional composition of Ashwagandha root powder per 100g (Kumari *et al*., 2016).

***Applications*:** While *Withania Somnifera's* restorative role has been thoroughly investigated, much less has been learned about its use in food. Uses for the leaves (dried and wet) and roots of the included ajagandha products include extrusions, drinks and juices, sweet treats, oatmeal and bread goods, dairy-based goods, and more (Gaurav *et al*., 2023). The ladoos that were made with cereal-legume blends and ashwagandha root powder were found to be highly enriched in fiber, fat, and, more significantly, in mineral contents along with conferring curative effects (Indu and Awasthi *et al*., 2018). Besides this, Ashwagandha root powder incorporated into baked goods such as Thepla and even breads shall reduce diabetes (Chaturvedi *et al*., 2018). It is claimed that sweets products with 0.5 to 0.6 percent ajagandha powder enhance consistency and self-life for 52 days when kept in the refrigerator (Chopade *et al*., 2022).

Table 2. Different method of uses of various parts of plant.

Parts of plant	Mode of Uses	Purpose	References
Roots	Powder, paste and tonic	Reduce inflammation, nervous breakdown, loss of memory, boost Immunity and treat insomnia	(Moharana et al., 2020)
Leaves	Powder, juice, paste and ointments	Applied to burns, wounds and treat fevers	(Sheoran et al., 2020)
Bark	Decoction	To treat asthma and bed sores	(Meher et al., 2016)
Seeds	N/A	To expel parasites out of the body and to treat chest problems	(Joshi et al., 2021)
Fruit (berries)	N/A	To treat fungal skin infections	(Balkrishna et al., 2022)

To improve the functional value and storage stability of cheese, *Withania Somnifera* fruit extract was used, the addition of the extract improved the storage stability and functionality of the cheese (Sharma *et al*., 2023). The energy, fibre content, minerals, and protein-rich powdered roots of *Withania Somnifera* increase their therapeutic advantages (Kumari *et al*., 2016). Because *Withania Somnifera* has a high nutritional profile, drink blends fortified with it can be used to make therapeutic fruit drinks. The resulting product was stable and appropriate to be stored at ambient humidity for 90 days' time period. Using 2% ajagandha root powder in prepared foods can help lower diabetes in rates. According to reports, ghee containing ajagandha powder, a substance called shatavari and vidarikand has more potent antioxidants than ghee which is made by the conventional way (Gaurav *et al*., 2023).

***Anxiety and depression*:** The Organization of World Health estimates that 3.6 and 4.4 percent of people worldwide suffer from anxiety and depression, respectively (Majeed *et al*., 2023). In Pakistan, estimations of prevalence vary from 22 to 60 percent (Nisar *et al*., 2019). Ten to fifteen percent of people, in general, suffer from depression. It is 15.9 percent estimated in India, which is substantially higher (Nareshrao *et al*., 2017). Remarkably, women experience depression at a higher rate than men. Anxiety is the most widespread mental illness and an alarming problem that impacts people of any generation. In the US, disorders related to anxiety are very common and disruptive, with an average lifetime incidence rate of around 30 percent. The most common psychiatric issues affecting the general public are anxiety disorders (Fuladi *et al*., 2021). Stress, referring to the body's physiological reaction to either physical or emotional threats, frequently coexists with anxiety. While short-term stressful exposure is intended to be a helpful coping strategy, extended stress is more likely to cause general health to deteriorate and the complexity of existing illnesses. It is a significant aggravating factor for people already having conditions like diabetes and high blood pressure, two conditions that are leading causes of death globally (Lopresti *et al*., 2019).

Anxiety and depression treatment plans are always being researched to manage and lessen the impact of these ongoing health hazards. There is a lot of interest in sedatives like benzodiazepine and other prescribed drug substitutes in making an effort to reduce exposure to the potentially dangerous side effects of these medications (Pratte *et al*., 2014). In modern medical science, a wide range of drugs are devoted to the potential treatment of enduring anxiousness and depression. According to reports, the individual's changing or adapted behaviour makes use of such medications a common source of addiction which is not easy to withdraw (Salve *et al*., 2019).

Increasing amounts of findings on these conditions forced us to look for viable medical and non-medical treatments that would assist us to live happy life that is free of anxiety and depression. Anxiety and stressful situations are understood by biological and hereditary evolution as a mean of defense that support a "fight-or-flight" reaction in appropriate circumstances. Environmental and social factors that cause an ongoing stress response, can contribute to the development of complex problems related to health including generalized anxious disorder, dangerous cardiovascular problems, arterial hypertension, anxiety, depression, and panic assaults, diminished cognitive functioning, difficulties with digestion, restlessness syndrome, autoimmune conditions, and abdominal fat accumulation (Ramana *et al*., 2018).

***Pathophysiology*:** Depression which is influenced by stress is linked to changes in the levels of cortisol, adrenaline or norepinephrine released (Salve *et al*., 2019). Depression may also arise as a consequence of an imbalance in monoamine neurotransmitters, which are substances such as dopamine, a hormone called norepinephrine and serotonin hormone. Disorders of anxiety are also possible as an outcome of a monoamine deficit. In addition to the interruption of the action of gamma-aminobutyric acid (the hormone GABA), the modulation of cortisol and the function of cholecystokinin have been connected to the control of an individual's emotional states of mind. Inflammation-promoting cytokines are the reason for the modification of tryptophan (TRP) biosynthesis has drawn interest as an unconventional hypothesis to explain the underlying causes, pathological and physiological processes associated with significant depression. Accordingly, variations in TRP metabolism might possibly be connected to the main depression related to the theory of hyperactivity of the HPA axis (Miura *et al*., 2008).

Long-term stress has been linked to obesity as well as other ailments. It has been demonstrated that elevated production of cortisol is the reason for the increase of hunger. Thus, the natural tendency to snack excessively when under stress may

have a physiological basis (Choudhary *et al*., 2017). Long-term stress also modifies the inhibitory and regulatory neurotransmitter systems, which is linked to psychiatric conditions, the most noticeable outcome is depression, which is often associated with the imbalance of neurotransmission both impulsive and suppressive throughout the prefrontal cortex. A critical assessment of rodent and human verification demonstrates the physiological processes underlying stress-related symptoms cause variations of transmission of GABA in the prefrontal cortex and also disrupt the regulation of functioning for mood management and disorders related to stress. These results findings may open the door to new GABA-related interneurons and neurotransmitter treatment targets by indicating that changes in regulating neural communication cause the occurrence of neurological conditions related to stress (Ghosal *et al*., 2017).

***Ashwagandha effects on depression and anxiety*:** Withanolide glycosides in ashwagandha have been shown to have anti-stress qualities and improve memory. They aid in the treatment of illnesses brought on by stress, including immunosuppressive conditions, abnormal metabolism of glucose, cognitive impairment, digestive ulceration, and variations in blood corticosterone concentrations. In the Health Science Centre of the University of Texas, research revealed that extract of *Withania Somnifera* inhibits transmission of nerves and decreases neuron activity slowing down the brain. When supplementation of root extract of ajagandha was used in place of a placebo, there was a considerable increase in plasma serotonin levels, which may indicate that this neurotransmitter production is the source of the effect. Ajagandha extract has GABAnergic activity also known to reduce the glutamate excitotocity and recover the level of dopamine (Chengappa *et al*., 2018). Supplementing with ashwagandha has been demonstrated to lower blood cortisol concentrations in stressed people while offering anti-inflammatory and antioxidant effects. This may have contributed to the rise in blood levels of serotonin (Majeed *et al*., 2023).

Human experiments using double-blind study and controlled placebo designs were conducted to assess *W. somnifera* anti-stress efficacy. A standardized extract of ajagandha (Shoden) containing a standard amount of 240 mg was randomly assigned to sixty individuals to take once a day. The Anxiety Rating Scale of Hamilton, cortisol variations, dehydroepiandrosterone-sulphate and the Depression and Anxiety, Stress Scale-21 were used to measure the outcomes. It was discovered that extract of ajagandha was linked to considerably higher mean plasma dihydroergotamine (DHE), haemoglobin content and decreases HAM-A score, rising C-reactive protein of cortisol, heart rate, and arterial pressure (Gaurav *et al*., 2023).

Figure 2. Impact of ashwagandha on mental health.

***Glucocorticoid reduction*:** Glucocorticoid hormone which demonstrates the body's response to stress in the presence of elevated levels of blood cortisol. It is secreted in a reaction to metabolic distress and suppresses the HPA axis, which has an impact on brain function and overall health (Gopukumar *et al*., 2021). The most widely accepted explanation for ajagandha anti-stress properties is that they affect the steroid hormones, cortisol of glucocorticoids and other hormone corticosterone, which are the primary hormones associated with stress in both humans and rats, respectively. Disruption induced by stress on the HPA axis is primarily caused by high levels of cortisol hormone and corticosterone. Different ajagandha preparations reduced the rise in proximal cortisol hormone and levels of corticosterone hormone brought on by stress. It was also discovered that WS reversed the drop in adrenal cortisol concentration brought on by stress. It was discovered that a hydroalcoholic extract of the root of ajagandha reduced hippocampus concentrations of corticosterone hormone in a rat in which hypobaric-hypoxia stress is induced, besides to its consequences for peripheral cortisol hormone and corticosterone hormone (Speers *et al*., 2021).

***Ashwagandha and serotonin*:** The neurotransmitter which is most well-researched in depression is serotonin. Studies employing tryptophan deprivation, which lowers central serotonin production, provide the most convincing proof for an abnormally decreased functioning of the system of central serotonergic. In individuals who are more likely to experience depression, such a decline causes the onset of depressed symptoms. Depression is also thought to be influenced by an inadequate supply of monoamine brain chemicals such as norepinephrine, serotonin and dopamine. In addition to the disturbance of gamma-aminobutyric acid, the modulation of cortisol along with the function of a substance, cholecystokinin has been connected to the control of a person's emotional moods. Compared to studies on anxiety and stress, fewer investigations have examined the impact of ajagandha on depression (Majeed *et al*., 2023). In another study on mice, Ashwagandha's effect on alcohol withdrawal anxiety was tested by administering variable oral doses. The study was conducted over two primary experiments- one determining alcohol withdrawal anxiety and the second examining chronic alcohol consumption. At 200 and 500 mg/kg doses, Ashwagandha showed maximal anxiolytic

effects, which were greater than even those of ethanol's tranquilization. Furthermore, the observation that Ashwagandha reduced alcohol consumption but increased water intake at the 500 mg/kg dose reaffirms that it is indeed potent for treating alcohol dependence. Neurochemical analyses further confirmed that Ashwagandha had increased levels of GABA and serotonin, possibly the mediators of its calming and mood-stabilizing capabilities (Bansal and Banerjee, 2016).

Using the nematode Caenorhabditis elegans, the study investigated the effects of withanolide A, an important compound from Ashwagandha, on oxidative stress, and serotonin modulation. Withanolide A was administrated by trial at a dose of 100 µM. Withanolide A later showed to strongly decrease the levels of those reactive oxygen species, with the antioxidant activity being thirteen times more potent than vitamin E. Also, withanolide A helped in upregulating serotonin receptors and the gene of serotonin transporter, implicating it in serotonin modulation. Molecular docking suggested that withanolide A had a stronger binding affinity for serotonin receptors than fluoxetine, indicating that it may share antidepressant effects. The findings indicate that withanolide A is a potential candidate for a natural antidepressant and an anti-aging compound (Naß *et al*., 2021).

Participants between the ages of 18 and 60 years were deemed eligible for inclusion in the study. Subjects with mild to moderate depression and anxiety symptoms were evaluated, and they received ashwagandha root extract of 500 mg, which contained 12.5 mg withanolides per day for 90 days. The extract of ashwagandha root was able to raise serum serotonin levels. All parameters, including biochemical and hematological remain in the normal range. The root extract was well tolerated throughout the study. The result suggested that ashwagandha root extract of 500 mg is effective in enhancing serum serotonin levels, helping to alleviate depression and anxiety (Majeed *et al*., 2023).

***Inhibition of IL-1β and TNF-α production*:** Stress triggers the body's activation of the HPA axis, which raises cortisol levels in the blood and impacts microglia, particularly those in the areas of the cortex of the prefrontal and hippocampal regions. Additionally, the sympathetic emission of norepinephrine triggered by stress has a direct impact on microglial activation, as evidenced by a surge in the central nervous system's proliferation of the cytokine that promotes inflammation, IL-1β. Interestingly, inflammation in the system is linked to inflammation of neurons and ultimately results in the occurrence of neurodegenerative conditions. When the blood-brain membrane barrier is breached during chronic inflammatory disease pathogenesis, material peripheral inflammation includes activation of leukocytes, migration, and distribution of circulating inflammatory metabolites enters the central nervous system (CNS) and eventually causes stimulates microglia. Over time, these overactive microglial cells collect and release a variety of pathogenic and neurotoxic intermediaries, including, monocytes and interleukins including IL-1β, nitric oxide, TNF-α, superoxides, and metabolites of fatty acids, which cause damage to neuron. Additionally, ajagandha demonstrated dependence on dosage suppression of the production of superoxide in monocytic cells of humans which are HL-60 stimulated with PMA (muscular atrophy). The reduction of inflammation of neurons suggested by the inhibition of particular cytokines associated with inflammation and peroxide may account for ajagandha anxiety-reducing properties (KrishnaRaju *et al*., 2023).

The study investigates the in vitro inhibition of neuroinflammation by ashwagandha leaf water extract in a primary microglial cell culture and in the BV-2 microglial cell line stimulated with β-amyloid and lipopolysaccharide. The extract was prepared through 10 g of ashwagandha leaf powder put in 100 ml of water, specifically to identify Withaferin A and Withanone as bioactive compounds. It finds ashwagandha to inhibit microglial activation and migration, suppress inflammatory cytokines TNF-α, IL-1β and reduce oxidative stress markers. Besides, the extracts induced arrest of the cell cycle and apoptosis in microglia activated, indicating their potential in the inflammatory reduction of neurons. The findings of this study together provide for important evidence that ashwagandha is a promising drug candidate for the treatment of neurodegenerative diseases through the targeting of inflammation reduction (Gupta and Kaur, 2016). In another study, microglial cells were exposed to 450 mg capsules of ashwagandha extract to see whether ashwagandha possesses anti-inflammatory and antioxidant properties. The results of the experiment indicated that Ashwagandha extract has a significant effect on the production of nitric oxide and reactive oxygen species, two markers of inflammation and oxidative stress. The studies also indicated that among all withanolides tested, Withaferin A was ten times more effective in reducing nitric oxide production than Withanolide A. This evidence supports the protective role of ashwagandha and its withanolides against disorders of neuroinflammation and oxidative stress (Sun *et al*., 2016).

***Gamma-Aminobutyric Acid (GABA) related activity*:** The most significant repressive neurotransmitter present in the central nervous system is GABA, and it is believed that GABAergic neurological communication is crucial for controlling anxiety. Medications which boost GABAergic function and are frequently used to treat disorders of anxiety, primarily work through receptors of GABA type A. Early clinical investigation indicates that chemicals in ajagandha engage with and modify receptors of GABAA, which could account for some of ajagandha anxiety-alleviating properties. Components in methanolic extract of root ajagandha have been demonstrated by receptor-binding experiments to have a significant affinity for receptors of GABAA and a much less favourable interaction for GABAB and receptors of opioid.

Numerous animal studies demonstrate the receptors of GABAA-specific action of WS. A methanolic extract of root ajagandha inhibited the stimulating effect of morphine on neurons containing dopamine in the ventral tegmental region in rats through a GABAA-mediated procedure, but not by the GABAB-regulated one (Speers *et al*., 2021).

Sub-therapeutic dosages of diazepam, a modulator of receptor of GABAA, GABA and agonist of GABA receptor, along with an effective concentration of an unknown ajagandha root extract raised the threshold for seizure in mice in a model of convulsions generated by pentylenetetrazol (PTZ). It is discovered in rat investigation that a mixture of pentobarbital and a methanolic extract ajagandha generated a higher protection against toxicities induced by PTZ than either drug alone. Furthermore, the protective properties of the extract were enhanced when a protective concentration of WS was combined with GABA (Ghosal *et al*., 2017). The structure-activity connections of withanolide associations with receptors of GABAA, potential interaction locations at the receptor complex of GABAA, and the presence or absence of populations of receptors of GABAA that are more responsive to ajagandha compounds all require more investigation (Speers *et al*., 2021).

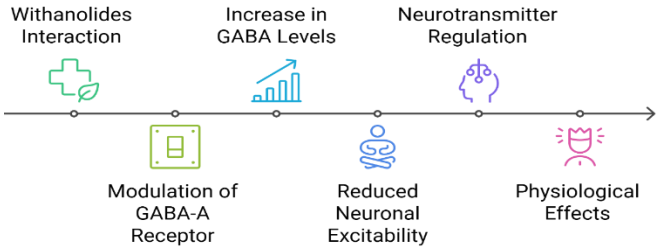

Figure 3. Nervous system influence of ashwagandha.

Assessments

***Hamilton anxiety rating scale*:** The anxiety level of participants was assessed by using the Hamilton Anxiety Rating Scale, which is a well-recognized tool for the assessment of psychological symptoms related to the severity of stress and anxiety. The study allowed sixty participants to be recruited having the ages 18 and 55 years of any gender and they were screened by inclusion and exclusion criteria. Baseline scale scores for the groups receiving ajagandha 250mg, ajagandha 600mg, and placebo were taken. The results show that ajagandha 600 mg per day was effective in reducing anxiety in individuals. According to the scale, ashwagandha users experienced a 41 percent decrease in the incidence of anxiety (Chandrasekhar *et al*., 2012).

***Serum cortisol levels*:** The most popular biomarker for determining psychological stress is plasma cortisol. Thus, it was employed to evaluate how the extract from ashwagandha roots affected the level of cortisol. In one investigation, 60 individuals were evaluated for participation in the study according to the criteria for inclusion and exclusion, regardless of sex and age around 18 and 55 years. Every individual's level of plasma cortisol was determined using a needle inserted into a blood sample taken in the morning. Measurements of the blood cortisol level were made at the initial state, week 4, and week 8. For this investigation, levels of plasma cortisol were expressed in ug/dL. Levels of plasma cortisol were significantly lower in the ajagandha treatment groups than in the placebo group (Salve *et al*., 2019).

***Safety*:** According to an analysis by a clinical part of the study, daily doses of 600 mg are considered safe for intake. A review of the adverse event log for this investigation indicates that high-concentration, wide spectrum ajagandha root extract is without danger and generally well-tolerated (Verma *et al*.,2021). The long-term ingestion of ashwagandha roots has also been established to be safe in animal studies. Along with ashwagandha, there were rarely any adverse effects that caused withdrawal or suspension symptoms. A warning to exercise caution involves not giving this herb to a person who has an allergy to plants from the Solanaceae family. No significant side events were reported during the study, and ashwagandha was generally well tolerated. All subjects were able to complete the 60-day study, further supporting the excellent tolerability of ashwagandha cursor (Lopresti *et al*., 2019).

***Conclusion*:** Ashwagandha has many therapeutic advantages in medicine, it is a non-specific herbal tonic reputed for its health benefits. High-concentration broad-spectrum extract of ajagandha contributes towards improving one's coping mechanisms against stress and, consequently the general state of life. Clinical studies display that root extract of ashwagandha might lead to exaggeratedly great reductions in measures of stress and improved perception of quality of life among the subjects. For various health conditions related to anxiety and depression, supplementation with this plant would be a very useful adjunct. This powerful adaptogen can be taken by a healthy fit individual one time a day to improve cognitive functioning and reduce depression levels. It may affect these factors of health positively through GABA inhibition, regulation of hypothalamic-pituitary-adrenal and serotonin enhancement which has beneficial effects in states of anxiety and depression.

***CRediT author statement*:** Fatima Amjad: Conceptualization; Writing; formatting; Data collection-original draft. Marriam Azhar: Conceptualization; writing; Review; editing. Muhammad Aamir: Corresponding author, Conceptualization; Writing - review & editing; Supervision.

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